



Eden Shield – Strategies and Concepts for Planetary Defense

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ASTE 527 Graduate Space Concepts Studio

Dept. of Astronautical Engineering

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ABSTRACT

Keywords: Strategies, Concepts, Short term Options, Consequences and Aftermath

In the fall of 2013, the participants in the ASTE527 graduate space concepts studio in the Dept. of Astronautical Engineering within the Viterbi School of Engineering at the University of Southern California in Los Angeles, California explored a range of visions dealing with asteroid impacts and options for planetary defense. Since much of the literature deals with long term planning and decades-long strategies and actions, this studio chose to turn their attention to options that might be exercised in the short term. **The problem posed : A rogue bolide on a terminal approach trajectory with between 1-2 years to impact.** Concepts and strategies were sought to deal with and thwart, minimize, or in the worst case, plan for survival of humanity through cataclysm aftermath. Each participant chose to deal with and shine light on a different facet of this very complex problem with global ramifications. Participants were given the freedom to imagine, create and evolve infrastructures and emplace and commission operational systems as they saw fit to make their scenario work for them. Final concepts for the team project called Eden Shield included:

PINT GLASS – What to do in the event the impact wipes out all life on Earth ?

Art DECO – State of the Art technologies to raise solar system situational awareness

The Trojan Defense – Use of Trojans and Hildas in Jovian system to intercept bolide

Directed Energy System Concept – High power lasers to ablate and disintegrate bolide

Dual Use Solar Power Satellites – Use energy from solar power satellites to mitigate

DISARM – Staged Nuclear Option to engage imminent threat

Lunar Moisture Farming – Framework for a bi-planetary Earth-Moon civilization

Astronaut Crew Health – Coping with a highly stressed civil population after impact

Spaceship Earth Revisited – Impact Aftermath: Surviving a Cataclysm in Cities



Concepts show a wide range of options available today to deal with a rogue bolide threat, all the way from early warning and evasive action to the aftermath of an impact and recovery options in large, crowded population centers of the globe. It is concluded that existing technologies are mature enough to allow us to implement a variety of actions, besides enhancing tracking potentially hazardous objects, and that global participation is key to commissioning a planetary defense infrastructure.

The program, abstracts, invited lecturers and reviewers and slidesets for the fall 2013 ASTE527 Space Concepts Studio team project Eden Shield may be found at :

http://denecs.usc.edu/hosted/ASTE/527_20111/Eden%20Shield%E2%80%93Concepts%20and%20Strategies%20for%20Planetary%20Defense/